

What is claimed is:

1. A method for reading a radiation image from a
stimulable phosphor sheet comprising a transparent sub-
5 strate and a stimulable phosphor layer containing therein
a latent radiation image by means of a radiation image-
reading means comprising a stimulating light-applying
unit and a stimulated emission-collecting unit comprising
a lens and a stimulated emission-receiving plane, which
10 comprises the steps of applying a stimulating light onto
the stimulable phosphor layer under the condition that
the stimulable phosphor sheet moves along a sheet plane
thereof in relation to the stimulated emission-collecting
unit; collecting a stimulated emission emitting from the
15 area onto which the stimulating light is applied on the
stimulated emission-receiving plane through the transpar-
ent substrate and lens; and photoelectrically converting
the collected emission into electric signals in the stim-
ulated emission-collecting unit, wherein the stimulable
20 phosphor sheet moves in relation to the stimulated emis-
sion-collecting unit under the condition that the stimu-
lating light-applied area of the stimulable phosphor
layer is kept apart from the center of the stimulated
emission-receiving plane with a space in the range de-
25 fined by a combination of a reference space and a focal
depth of the lens, the reference space being defined by a
length at which the stimulated emission emitting from the
stimulable phosphor layer focuses on the stimulated emis-
sion-receiving plane after passing through the transpar-
30 ent substrate and lens.

2. The method of claim 1, wherein the stimulable
phosphor sheet has a reference plane area on both side
surfaces of the transparent substrate on the side of the
35 stimulable phosphor layer and the stimulable phosphor
sheet is moved under the condition that the phosphor

sheet is supported at the reference plane areas on a supporting means which is arranged in a position fixed in relation to the stimulated emission-collecting unit.

5 3. The method of claim 1, wherein the stimuable phosphor sheet has a reference plane area on both side surfaces of the transparent substrate on the side of the stimuable phosphor layer, the stimuable phosphor sheet is supported at the reference plane areas on a supporting
10 means, and the stimulated emission-collecting unit is moved on the supporting means.

15 4. The method of claim 2, wherein the reference plane area of the transparent substrate has on a surface thereof irregularities within $\pm 100 \mu\text{m}$ in terms of a mean irregularity height.

20 5. The method of claim 1, wherein the transparent substrate is a rigid transparent substrate.

25 6. The method of claim 5, wherein the rigid transparent substrate is a glass sheet.

30 7. The method of claim 1, wherein the stimuable phosphor layer has a stimulated emission-reflecting layer on the side not facing the substrate.

35 8. The method of claim 1, wherein the stimuable phosphor layer is produced by a gas phase deposition method.

 9. The method of claim 1, wherein the stimulating light-applying unit and stimulated emission-collecting unit of the radiation image-reading means are arranged on the side facing the transparent substrate of the stimuable phosphor sheet.

10. A radiation image reading apparatus for performing the method of claim 2, which comprises the radiation image-reading means, the supporting means which is
5 arranged in a position fixed in relation to the radiation image-reading means and allows movement of the stimuable phosphor sheet along the sheet plane by supporting the stimuable phosphor sheet at the reference plane areas, and a driving means for driving the movement of the
10 stimuable phosphor sheet.

11. A radiation image reading apparatus for performing the method of claim 3, which comprises the radiation image-reading means, the supporting means which is
15 arranged in a position fixed in relation to the stimuable phosphor sheet and allows movement of the radiation image-reading means, and a driving means for driving the movement of the radiation image-reading means.

12. A method for reading a radiation image from a stimuable phosphor sheet comprising a substrate and a stimuable phosphor layer containing therein a latent radiation image by means of a radiation image-reading means comprising a stimulating light-applying unit and a
20 stimulated emission-collecting unit comprising a lens and a stimulated emission-receiving plane, which comprises the steps of applying a stimulating light onto the stimuable phosphor layer under the condition that the stimuable phosphor sheet moves along a sheet plane
25 thereof in relation to the stimulated emission-collecting unit; collecting a stimulated emission emitting from the area onto which the stimulating light is applied on the stimulated emission-receiving plane through not the substrate but the lens; and photoelectrically converting the
30 collected emission into electric signals in the stimulated emission-collecting unit, wherein the stimuable phosphor sheet moves along the sheet plane by supporting the stimuable phosphor sheet at the reference plane areas, and driving the movement of the stimuable phosphor sheet.

phor sheet moves in relation to the stimulated emission-
collecting unit under the condition that the stimulating
light-applied area of the stimuable phosphor layer is
kept apart from the center of the stimulated emission-
5 receiving plane with a space in the range defined by a
combination of a reference space and a focal depth of the
lens, the reference space being defined by a length at
which the stimulated emission emitting from the stimu-
able phosphor layer focuses on the stimulated emission-
10 receiving plane after passing through the lens.

13. The method of claim 12, wherein the stimuable
phosphor sheet has a reference plane area on both side
surfaces of the substrate on the side of the stimuable
15 phosphor layer and the stimuable phosphor sheet is moved
under the condition that the phosphor sheet is supported
at the reference plane areas on a supporting means which
is arranged in a position fixed in relation to the stimu-
lated emission-collecting unit.

14. The method of claim 12, wherein the stimuable
phosphor sheet has a reference plane area on both side
surfaces of the substrate on the side of the stimuable
phosphor layer, the stimuable phosphor sheet is support-
25 ed on a supporting means, and the stimulated emission-
collecting unit is moved on the reference plane areas of
the stimuable phosphor sheet.

15. The method of claim 14, wherein the stimuable
30 phosphor sheet has on a surface of the stimuable phos-
phor layer irregularities within $\pm 50 \mu\text{m}$ in terms of a
mean irregularity height.

16. The method of claim 12, wherein the substrate
35 is a rigid substrate.

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17. The method of claim 16, wherein the rigid substrate is made of material having a modulus of elasticity of 1×10^5 kgf/cm² or higher and a thickness in the range of 200 μ m to 10 mm.

18. The method of claim 12, wherein the stimuable phosphor layer is produced by a gas phase deposition method.

19. The method of claim 12, wherein the stimulating light-applying unit and stimulated emission-collecting unit of the radiation image-reading means are arranged on the side facing the stimuable phosphor layer of the stimuable phosphor sheet.

20. A radiation image reading apparatus for performing the method of claim 13, which comprises the radiation image-reading means, the supporting means which is arranged in a position fixed in relation to the radiation image-reading means and allows movement of the stimuable phosphor sheet along the sheet plane by supporting the stimuable phosphor sheet at the reference plane areas, and a driving means for driving the movement of the stimuable phosphor sheet.

21. A radiation image reading apparatus for performing the method of claim 14, which comprises the radiation image-reading means, the supporting means which is arranged in a position fixed in relation to the stimuable phosphor sheet, and a driving means for driving the movement of the radiation image-reading means on the reference plane areas of the stimuable phosphor sheet.

22. A stimuable phosphor sheet comprising a rigid substrate, a stimuable phosphor layer having irregularities on a surface thereof, and a reference plane-forming

guide means attached to the rigid substrate on both side surfaces thereof, the reference plane-forming means having a surface of irregularity identical to those of the surface of the stimuable phosphor layer.

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23. The stimuable phosphor sheet of claim 22, wherein the stimuable phosphor layer has a curved, deformed or sloping surface thereon, and the reference plane-forming guide means having a surface identical to the surface of the stimuable phosphor layer

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24. The stimuable phosphor sheet of claim 23, wherein the stimuable phosphor layer is produced by a gas phase deposition method.

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